

# Operating Manual

## Metris Vibe Ex

Revision: 03

00	25.02.2019	Operating Manual	PJO	
01	16.02.2021	Operating Manual	EPG	
02	03.03.2021	Operating Manual	EPG	
03	22.03.2022	Operating Manual	EPG	
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## ABBREVIATIONS

Abbreviation	Description
ADR	European Agreement concerning the International Carriage of Dangerous Goods ( <b>A</b> ccord européen relatif au transport international des marchandises <b>d</b> angereuses par route)
CE	Conformity with European directive ( <b>C</b> onformité <b>E</b> uropéenne)
EMC	Electromagnetic Compatibility
EN	European Standard ( <b>E</b> uropa- <b>N</b> orm)
IEC	International Electrotechnical Commission

Table 1: Abbreviations

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## PREFACE

The present operating manual contains the information required according to valid regulations (2014/30/EU, 2014/53/EU, 2011/65/EU, 2014/34/EU) for transport, installation, operation, and maintenance of the vibration sensor METRIS VIBE.

The manual is intended for persons who work with the METRIS VIBE described herein.

The only way to avoid faults in the equipment and guarantee trouble-free operation is to follow this operating manual. Thus, persons responsible must be acquainted with the present operating manual and have access to it at all times.

The operating manual is a part of the user information for placing the equipment on the market and must be kept in a place accessible to the operating company and to the operating personnel. If the location of the equipment is changed, the manual and/or operating instructions must be passed on with the equipment.

The remarks in the manual and/or operating instructions must be observed at all times during the service life of the equipment. Read through the appropriate section in the operating instructions carefully before starting work.

**ANDRITZ does not accept any liability in the event of operating faults and any damage that may be caused as a result of this manual not being obeyed.**

## INFORMATION ON THE MANUFACTURER

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DVR: 005 0008, ARA license no.: 7485  
VAT (UID): ATU28609707

## 1 INTRODUCTION

This manual is describing the METRIS VIBE sensor supplied by ANDRITZ.

Condition Monitoring Systems (CMS) are described as systems that monitor the condition of machines and systems to provide advanced detection or prediction of damage.

As consequences increased vibrations are indicating increased wear, damage to bearings, rotating parts, the frame of the machine or the building. To identify characteristic frequencies Fast Fourier transformation is used.

The Andritz METRIS VIBE sensor uses Bluetooth (BLE) communication to send information via Industrial Gateways to a Cloud for further analyzing and storage.

The sensor is taking short samples of the actual vibration stream based on an adjustable interval.

The manual contains essential information on correct, safe, and fit-for-purpose operation of the Metris Vibe sensor. Adherence to these instructions helps to avoid dangerous situations known to date.

### 1.1 ABOUT THIS MANUAL

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Target audience

The personnel assigned to work with the Metris Vibe sensor must read the manual before commencing work. It is too late to do so while working on the equipment, which may have serious technical and health consequences.

In particular, the following must be considered:

- the entire *Safety* section and
- the safety instructions provided in the individual sections of the manual.

### 1.2 WARRANTY AND LIABILITY

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ANDRITZ excludes warranty and liability claims for defects or damage if these are due in particular to one or several of the reasons mentioned below:

Non-compliance with safety information, recommendations, instructions, and/or other information in the manual.

- Incorrect start-up and operation of the METRIS VIBE sensor.
- Use of the METRIS VIBE sensor for purposes other than its intended use.
- Unauthorized structural changes or additions to the METRIS VIBE sensor that do not conform to the basic configuration supplied and tested as well as changes to the user software.

### 1.3 COPYRIGHT

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This document is protected by copyright and contains confidential information belonging to ANDRITZ and/or companies affiliated to ANDRITZ. By accepting this document, each partner expressly confirms that he will not copy, duplicate, or make it available to third parties, nor disclose or forward it to anyone except with the express consent of ANDRITZ or a subsidiary of ANDRITZ.

### 1.4 INTENDED USE

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The METRIS VIBE sensor may only be used in accordance with the present operating manual. Any operations outside the performance limits stated in the chapter of technical specification and result in damages for which ANDRITZ shall not accept any liability.

Intended use also includes compliance with this manual, adhering to operating conditions.

The Metris Vibe sensor is used for measuring the vibration and temperature of suitable equipment.

It is not allowed to use the METRIS VIBE sensor for fixing purposes.

Correct and safe operation of the Metris Vibe sensor requires proper transport and storage, installation and assembly, as well as careful operation.

### 1.5 NOTICE OF CLAIMS

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ANDRITZ must be informed immediately of any defects or damage detected by the customer or operating personnel or other deviations from the normal operating condition regardless of whether they occur during or after expiry of the warranty period.

This notification to ANDRITZ should include the following information in particular:

- Description of defect or damage (symptoms, detected when and by whom)
- Identification of systems or components affected (identification number)

## 1.6 SHIPPING



### NOTICE

**Special symbols are printed on the packaging according to common international practice. It is important to take these symbols into account when loading, unloading, or moving the goods.**

Non-compliance with these instructions can result in material damage.

If in doubt, always ask the manufacturer to organize a suitable solution.

The following ambient conditions apply to shipping and storage as well as in operation:

- dry
- frost-free
- corrosion-protected (e.g. salt water)

### Symbols on goods for transport:


Name	Symbol
Vor Nässe schützen  Keep dry	

Table 2: Goods for transport – symbols

## 1.7 STORAGE

### 1.7.1 INCOMING INSPECTION

## Damage

Check the deliveries immediately for visible damage upon arrival at the place of destination, preferably in the presence of the forwarding agent.



### Information

**Care must be taken to ensure that special packaging is not damaged during the inspection.**

In case of obvious transport damage proceeds as follows:

1. Take photos of the transport damage.
2. Open the damaged package only to the point where damage to components can be verified and documented.
3. Then re-pack the damaged components carefully and store them in a dry place.

## Completeness

Check the consignment for completeness using the packing list. Inform the department responsible of any missing parts.

### 1.7.2 PACKAGING

Depending on the packed components, the packaging serves to provide protection or only to cover the parts and components of the METRIS VIBE sensor.



### Information

Sealed packaging must not be opened on the way to the destination or during handling. Customs and forwarding agents must be informed in good time about the forthcoming arrival of such consignments. Arrange with the customs officials to have the goods inspected on site.

Sealed packaging is used for very sensitive components that are to be stored in the country of destination for a long time.



Information

Follow the respective disposal instructions for environmentally friendly disposal of the packaging.

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### 1.7.3 STORAGE

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*NOTICE*






Parts that are not stored correctly can suffer damage after a short period of time due to climatic influences, resulting in a need for repeat treatment or re-machining.

Always follow the manufacturers' information regarding storage of individual parts.

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Each packing unit is assigned to a storage class in accordance with the packing list. Store all packing units delivered according to their storage classes (or higher storage classes) at the place of destination after they have been accepted.

The conditions and minimum requirements of the 6 storage classes are described in Table 3:

Storage class		Storage location	Storage conditions	Minimum requirements
1	No symbol	Open-air storage	Open-air storage area (outdoors)	<ul style="list-style-type: none"> <li>Stabilized, drained gravel floor</li> </ul>
2			Covered open-air storage area or trajectory roof	
3		Warehouse	Covered storage areas	<ul style="list-style-type: none"> <li>Stabilized, drained gravel floor</li> <li>Tarred or concrete floor if forklifts or mobile cranes are used</li> <li>Electric lighting</li> <li>Shelves and racks protected against vermin and rodents</li> </ul>
4			Heated rooms > 8°C	
5			Air-conditioned rooms 0 – 40°C Relative humidity 10 – 75%	
6			Dangerous goods store	

**Table 3: Storage classes**



**NOTICE**

- In order to avoid rust film on parts made of stainless steel, always store them separately from parts made of carbon steel.
- The parts should be left in their original packaging wherever possible.
- Always consider the maximum permitted floor load when storing goods.

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### 1.7.3.1 STORAGE OF METRIS VIBE SENSORS

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The following information should be considered when putting METRIS VIBE sensors into storage:

It is possible to storage the METRIS VIBE Ex sensors up to 2 years if the sensor is not activated.

Storage according to storage class indicated or storage class 4 as a minimum:

- The parts must be supported securely on wooden boards covered with plastic sheeting at a height of approximately 15-20 cm from the floor.
- Store small and, in particular, unpacked parts on storage racks.
- Take fire protection regulations into account.

## 2 SAFETY

Safety instructions for components that were not manufactured by ANDRITZ are included in the descriptions of the component suppliers and must be obeyed as well.

### 2.1 SAFETY INSTRUCTIONS

Everything mentioned in the *Safety* section is important and safety-relevant.

The warning notices mentioned in the individual sections are marked with a pictogram, signal word, and signal color as follows:

Choice and execution of danger symbols in accordance with ADR, Dangerous Material Ordinance, etc.



#### CAUTION

This marking warns of an imminent health risk.

Ignoring these instructions can result in moderate or slight injuries and to environmental and material damage.



#### NOTICE

This marking warns of a dangerous situation.

Ignoring these instructions can result in material damage.



#### Information

This marking contains useful information.

The activity described will be easier to perform professionally if this information is taken into consideration.

### 2.2 BASIC SAFETY INSTRUCTIONS

The METRIS VIBE sensor has been built according to the state of the art, as well as acknowledged safety regulations and specifications.



### 3. METRIS VIBE SENSOR START UP

#### 3.1 ACTIVATING THE METRIS VIBE FROM STORAGE MODE

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It is necessary to activate the Metris Vibe sensor from storage mode before installing it on equipment. This is possible with the Metris Vibe mobile App. In the App you have to connect for the first time with the sensor for activation.

When using the gateway router this happens automatically.

The serial number is printed on each sensor starting with Axxxx.

#### 3.2 INSTALLATION INSTRUCTION

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The accuracy of the high frequency response is directly affected by the mounting technique selected. Maximum output will be generated when vibration is acting along the center axis of the vibration sensor (this is particularly important when monitoring bearings and ventilation fans). The vibration sensor is equally effective at detecting vibration in housing and casings. It is important to identify points of vibration where the maximum output signals can be obtained. It is also important to prepare an accurate mounting position for the vibration sensor and if possible, choose a relatively flat area where a spot face of about 36mm can be created.

##### Procedure:

1. Select a mounting position, in any plane, as close as possible to the vibration source.
2. Prepare a flat, smooth, unpainted surface larger than the base of the Metris Vibe sensor (recommended to use a wired drilling machine, 300-600rpm).
3. Drill a hole with a suitable diameter in the center of the flat area, with 10mm depth.
4. Using a suitable sized tap for the mounting option (M8x1.25) of the sensor, screw the sensor in the hole ensuring that there is at least 7mm of full thread.
5. De-burr the prepared hole and thoroughly clean the surface and the base of the stud with solvent.
6. Apply Loctite Screw lock to the thread on the METRIS VIBE sensor and smear grease on the mating surface to ensure good coupling to the METRIS VIBE sensor.
7. Screw the METRIS VIBE sensor into the threaded hole and tighten to 8Nm torque with a torque wrench WAF30.



CAUTION

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It is very important to mount the sensor according the installation instruction.

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### 3.3 DOWNLOADING DATA

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To download data from the sensor Blue Tooth LE is used. Therefore 2 (two) possibilities are foreseen to get access to the required data.

- **Industrial Gateway routers**

Data is downloaded from sensor, automatically, via industrial gateway routers.

- **Smartphone or Tablet**

Data is downloaded from sensor, manually, using the METRIS VIBE mobile App. The app is available for Android and IOS.

### 3.4 SETTINGS METRIS VIBE SENSOR

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All settings have to be done via Blue Tooth LE. Therefore 2 possibilities are foreseen to change the settings.

- **Industrial Gateway routers**

On the webinterface it is possible to configure the settings and also check the battery level of a sensor.

For details take a look into the manual of the industrial gateway software

- **Smartphone or Tablet**

Via the METRIS VIBE mobile App, available for Android and IOS, it is possible to configure the settings for a given sensor. For details please check the METRIS VIBE mobile App user manual.

Parameter	Description	Default value
Measurement Interval	This is the interval between the samples which are taken of the vibration and temperature.	360 min.
Measurement G range (sensitivity)	This is the measuring range of the vibrations sensor	±8g
Sampling frequency	Rate of sampling of the vibration sensor. The frequency shown in the FFT will be the half of the sampling frequency.	3200Hz
Recording time	The duration of one vibration sample which is being measured	640ms

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### 3.5 SPECIAL CONDITIONS

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The ambient temperature range is set from -40°C to +85°C.

#### Category 1 equipment

The vibration sensor may only be operated in an explosive atmosphere, which requires equipment of category 1, if atmospheric conditions exist (temperature from -20°C to + 60°C, pressure from 0.8 bar to 1.1 bar).

## 4. REPAIR



#### *NOTICE*

##### **No Repairing possible**

If the METRIS VIBE sensor is damaged it is not possible to repair it. In this case you have to replace the sensor with a new one.

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## 5. DECOMMISSIONING

If the METRIS VIBE sensor is no longer fit for use and is to be scrapped, it must be decommissioned and disassembled.

### 5.1 DISPOSAL

Comply with all national, regional and local legal requirements and regulations during the disposal or recycling of parts and components of the METRIS VIBE sensor as well as of materials needed to operate it.

High-quality recyclable materials like stainless steel of an adapter can be recovered by means of a scrapping process with a high recycling quota.



**Metris Vibe sensor has a Lithium battery encapsulated which can not be separated. Due to that reason remove this part as an electrical and electronic component. Disposal in the normal domestic waste is not permitted.**

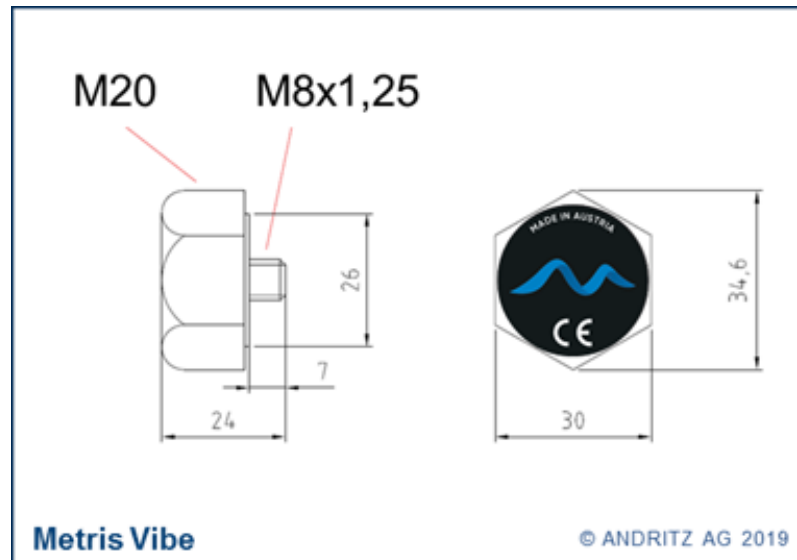
## 6. AREA OF APPLICATION

Version	Identification
Zone 0	IBExU 19 ATEX1055 X II 1G Ex ia IIC T5 Ga
Zone 20	IBExU 19 ATEX1055 X II 1D Ex ia IIIC T95°C Da

## 7. TECHNICAL DATA AND AMBIENT CONDITIONS

Measurement:	Vibration: x-axis, y-axis, z-axis Temperature
Frequency Range:	10Hz - 12800Hz
Sampling Frequency:	100 Hz - 25600Hz
Number of measured values per measurement and axis:	Maximum 6000 samples
Sampling Time:	100ms - 5000ms
Sensitivity:	±8g, ±16g, ±32g
Data Acquisition:	16 bit ADC
Measurement interval:	User defined
Storing of Samples:	Depending on the used mode there is a different amount of measurements which can be stored directly on the Metris Vibe Standard Mode (3200Hz, 640ms): 82 measurements High Frequency Mode (12800Hz, 320ms): 47 measurements High Resolution Mode (3200Hz, 1280ms): 47 measurements
MCU:	Ultra low power consumption processor, 32 bit
RF Communication:	2.4 GHz Low Power, BLE
Software:	Over the Air firmware update
Battery life time:	Up to 3 years, depending on the sampling settings
Mounting orientation:	All orientations
Mounting System Connection:	M8 x 1.25 thread
EN 60529 protection:	IP69K
Temperature range:	-40°C to 85°C
Dimensions:	Ø34.6mm x 24mm
Weight:	60g
Max. surface temperature:	Ambient temperature
Battery:	CR2477N, 3V, Lithium, 950mAh
Max. current	10mA
Nom. current	0.02mA
Use of certain hazardous substances in electrical and electronic equipment according to 2011/65/EU	Restricted substances referred to in Article 4 (1) and maximum concentration are in tolerance

## 8. OUTLINE DRAWING



## 9. RESERVED FOR DECLARATION OF CONFORMITY



### EG Konformitätserklärung

im Sinne der Richtlinie über die elektromagnetische Verträglichkeit 2014/30/EU, Anhang IV, der Richtlinie 2011/65/EU gefährlicher Stoffe in Elektro- und Elektronikgeräten, Anhang VI der Richtlinie 2014/53/EU Bereitstellung von Funkanlagen auf dem Markt, Anhang VI der ATEX-Richtlinie 2014/34/EU, Anhang X

Hiermit erklären wir, dass das nachfolgend bezeichnete elektrische Betriebsmittel den grundlegenden Gesundheits- und Sicherheitsanforderungen den EU-Richtlinien entspricht, sowie die Vorschriften der Richtlinie 2011/65/EU und des Rates vom 8. Juni 2011 zur Beschränkung zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe erfüllen.

Gerätetyp/Produkt:	Metris-Vibe
Serie und Chargennummer:	A-Serie und Ayyyy
Kennzeichnung:	IBExU19ATEXxxxx X
	II 1G Ex ia IIC T5 Ga
	II 1D Ex ia IIC T95°C Da

Durch notifizierte Stelle (Name, Kennnummer): IBExU Institut für Sicherheitstechnik, NB 0637

\*) (Axxx) bedeutet, dass der erste Buchstabe die Serie kennzeichnet und die „xxx“ stehen als Platzhalter für die eindeutige Kennzeichnung des Produktes.

#### Beschreibung der elektrischen Betriebsmittel:

Der Metris-Vibe ist ein Sensor der die Beschleunigungsdaten erfasst und dies auf Basis Blue Tooth LE Protokoll überträgt

#### Einschlägige Bestimmungen:

EMV-Richtlinie 2014/30/EU / RoHS-Richtlinie 2011/65/EU, RED-Richtlinie 2014/53/EU, ATEX-Richtlinie 2014/34/EU jeweils in der geltenden Fassung

#### Angewandte harmonisierte Normen, deren Fundstellen im Amtsblatt der EU veröffentlicht wurden und/oder nationalen technischen Spezifikationen:

EN60079-0:2012+A11:2013 (Explosionsgefährdete Bereiche Teil 0: Betriebsmittel); EN60079-11:2012 (Explosionsgefährdete Bereiche Teil 11: Geräteschutz durch Eigensicherheit „I“).

EN300 440 Class 2 (Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM) — Funkanlagen mit geringer Reichweite — Funkgeräte zum Betrieb im Frequenzbereich von 1 GHz bis 40 GHz; EN300328 (Breitband-Übertragungssysteme — Datenübertragungsgeräte, die im 2,4-GHz-ISM-Band arbeiten und Breitband-Modulationstechniken verwenden);

  
 Vice President Global Andritz Automation (GAA)  
 - Gerhard Schiefer -

  
 Project Manager R&D Automation  
 - Maximilian Müller -

Ort/Datum: Graz, 17.06.2019

## 10. FCC AND ISED INFORMATION

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:*

- (1) l'appareil ne doit pas produire de brouillage, et*
- (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est*

### NOTICE:

Changes or modifications made to this equipment not expressly approved by ANDRITZ may void the FCC authorization to operate this equipment.

### 10.1 CLASS B DIGITAL DEVICE

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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## **10.2 RF EXPOSURE INFORMATION ACCORDING 2.1091 / 2.1093 / KDB 447498 / RSS-102**

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### *Radiofrequency radiation exposure Information*

The radiated output power of the device is below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized.

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## **10.3 USED FREQUENCY RANGE, USED MODES AND ANTENA INFORMATION**

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### *Frequency range*

2.402 - 2.480 GHz, 40 channels of 2Mhz bandwidth each according to the BLE specification.

### *Used Modes*

The Bluetooth device uses the 1 Mbit/s mode, however 2 Mbit/s, S2 coded and S8 coded were also measured as modes during the tests.

### *Antena information*

Antenna chip W3008 from PulseLarsen.

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## **10.4 FCC ID**

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FCC ID: 2AX58-METRISVIBE

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## **10.5 ISED ID**

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ISED ID: 26689-METRISVIBE

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## **10.6 HVIN**

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HVIN: Ex

